

NON-PUBLIC?: N

ACCESSION #: 9203270201

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 2 PAGE: 1 OF 03

DOCKET NUMBER: 05000457

TITLE: Turbine Control Circuit Failure causes Reactor Trip

EVENT DATE: 02/25/92 LER #: 92-001-00 REPORT DATE: 03/24/92

OTHER FACILITIES INVOLVED: None DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 098

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: E. Woloszyn, Operational Analysis TELEPHONE: (815) 458-2801

Ext. 2634

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: TB COMPONENT: XC MANUFACTURER: W120

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On February 25, 1992 Unit 2 had been placed on Economic Generation Control (EGC). At 1233, a Contact Closure Interlock (CCI) alarm was received on the turbine-generator control panel. Operational Analysis Department (OAD) determined that the CCI alarm was from EGC. The unit

Nuclear Station Operator (NSO) placed turbine control to the "Manual" mode. The CCI alarm was then reset and the NSO noticed that both lenses of the Transfer Throttle Valve/Governor Valve (TV/GV) lite were illuminated. OAD then reset the computer used to operate the turbine. At 1446, turbine control was returned to "Auto." The governor valves immediately started opening. Simultaneously, the throttle valves began to close. When all 4 throttle valves reached the closed position, a turbine trip signal was generated. Since reactor power was above the P-8 setpoint (30%), a reactor trip also occurred. The cause was a defective circuit in the turbine control system. Failure of this circuit caused the "Auto" control section of the computer to reset the valve control from governor valve control to throttle valve control. The defective circuit board was replaced. The system was tested and returned to service.

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END OF ABSTRACT

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A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 2; Event Date: February 25, 1992; Event Time: 1446

Mode: 1 - Power Operation; Rx Power: 98%;

RCS AB! Temperature / Pressure: NOT/NOP;

B. DESCRIPTION OF EVENT:

On February 25, 1992 Unit 2 had been placed on Economic Generation

Control (EGC). At 1233, a Contact Closure Interlock (CCI) alarm was received on the turbine-generator control panel. The unit was automatically removed from the EGC mode. Control room personnel contacted a representative from the Operational Analysis Department (OAD) (non-licensed) to begin system troubleshooting.

At 1430, OAD arrived in the control room. After reviewing the vendor manual, it was determined that the source of the CCI alarm was from EGC. NOTE: This alarm condition had previously occurred and OAD was familiar with the symptoms.

The unit Nuclear Station Operator (NSO) (licensed-R0) was directed to place turbine control to the "Manual" mode. The maintenance test key was placed in the "On" position. The CCI alarm was then reset and the maintenance test key w&3 turned to the "Off" position.

When the NSO was ready to place turbine control back to "Auto," the NSO noticed that both lenses of the Transfer Throttle Valve/Governor Valve (TV/GV) lite were illuminated. This lite configuration is only on during unit startup when a transfer to governor valve control from throttle valve control is occurring. Since this condition did not exist, OAD thought it was an indication problem.

OAD directed the NSO to place the unit in the "Auto" mode. The NSO placed turbine control to "Auto" without incident.

To clear the abnormal TV/GV lite indication, OAD directed the NSO to place the turbine control to "Manual." OAD then reset the computer

used to operate the turbine. This action was done with the expectation that the TV/GV lite would return to normal. After the reset was completed, the "TV Transfer" lite was illuminated. With the previous successful transfer back to "Auto," OAD felt that returning to "Auto" would not cause a problem. A discussion between OAD, the NSO and a Shift Engineer (licensed-SRO) then occurred. The general thought was that since no problem had occurred during the previous transfer to "Auto," it would be safe to return to "Auto." If any unexpected problem occurred "Manual" control could be used to stop any transient.

At 1446, turbine control was returned to "Auto." The governor valves immediately started opening causing generator load to increase. Simultaneously, the throttle valves began to close. The NSO attempted to return turbine control to "Manual," but the pushbutton dislodged and the turbine remained in "Auto." When all 4 throttle valves reached the closed position, a turbine trip signal was generated. Since reactor power was above the P-8 setpoint (30%), a reactor trip also occurred. Due to the turbine trip from high power, Auxiliary Feedwater (AF) BA! actuated to restore level in the steam generators. The plant responded as expected with the exception of the Nuclear Instrumentation (NI) IG! system.

Intermediate Range (IR) channel N-36 remained above the P-6 reset setpoint (5E-11 amps) due to detector undercompensation. Source

Range channels N-31 and N-32 were manually energized.

The appropriate NRC notification via the ENS phone system was made at 1605 pursuant to 10CFR50.72(b)(2)(ii).

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

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C. CAUSE OF EVENT:

The cause of the event was a defective circuit in the turbine control system. Failure of this circuit caused the "Auto" control section of the computer to reset the valve control from governor valve control to throttle valve control. When "Auto" was selected after the computer was reset, the system transferred to a speed control mode. When the turbine went to speed control, the throttle valves went closed as designed. The closure of the throttle valves generated the turbine trip signal.

A contributing cause was the turbine "Manual" pushbutton dislodging when depressed by the NSO. Had the pushbutton remained in place, the transfer to "Manual" could have prevented the turbine trip.

The undercompensation of IR N-36 was caused by a decrease in detector sensitivity combined with gamma activation of the reactor

vessel area surrounding the detector. The compensating voltages were later decreased to reduce the effects on the IR caused by the increased gamma flux present after a reactor shutdown.

D. SAFETY ANALYSIS:

Plant and public safety were not affected. The turbine trip caused the reactor trip. Redundant trains of reactor protection (RP) JG! and engineered safety features (EF) JG! were operable, available, and effective in performing their design functions. The undercompensation of N-36 was conservative in that the gamma flux was added to the neutron flux. This factor resulted in indicated reactor power greater than actual reactor power. At higher reactor power levels, the gamma flux ratio is insignificant when compared to the neutron flux.

E. CORRECTIVE ACTIONS:

The defective circuit board was replaced. The system was satisfactorily tested and returned to service.

The control panel with the "Manual" control pushbutton will be replaced. This item will be tracked to completion by Action Item No. 457-180-92-00101.

The compensating voltage of both intermediate range detectors were decreased to reduce the effects of gamma flux at low power. The compensating voltages will be adjusted on a more frequent basis.

F. PREVIOUS OCCURRENCES:

None

G. COMPONENT FAILURE DATA:

Manufacturer Nomenclature MFG Part Number

Westinghouse Analog Comparator 2838A32G01

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Commonwealth Edison

Braidwood Nuclear Power Station

Route #1, Box 84

Braceville, Illinois 60407

Telephone 815/458-2801

March 24, 1992

BW/92-0174

U.S. Nuclear Regulatory Commission

Document Control Desk

Washington, D. C. 20555

Dear Sir:

Subject: Licensee Event Report 92-001-00

The enclosed Licensee Event Report from Braidwood Generating Station

is being transmitted to you in accordance with requirements of

10CFR50.73(a)(2)(iv) which requires a 30-day written report.

This report is number 92-001-00; Docket No. 50-457.

K. L. Kofron

Station Manager

Braidwood Nuclear Station

KLK/DN/dla

530/ZD85G

Encl: Licensee Event Report No. 92-001-00

cc: NRC Region III Administrator

NRC Resident Inspector

INPO Record Center

CECo Distribution List

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